



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
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D212-664-207TRN
Job Sheet 191075



Part No: D212-664-207TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 2/21/19

Job Tracking No:

Due Date: 4/12/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV D IPP Rev:A New Issue 08-03-06 DD verified by:ec IPP Rev B 08.04.02 Removed polish EC verified DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		DAS Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
100	Mori Seiki TL-40 - 1	1 pcs	4/12/19	4/12/19	0.00	2.63	Mori Seiki TL-40 - 1		66-2019-05-21
110	QC 2	1 pcs	4/12/19	4/12/19	0.00	0.00	QC 2 - 1		9-89
							QC 2 - 12		
							QC 2 - 14		
							QC 2 - 17		
							QC 2 - 19		
							QC 2 - 2		
							QC 2 - 20		
							QC 2 - 22		
							QC 2 - 23		
							QC 2 - 25		
							QC 2 - 32		
							QC 2 - 33		
							QC 2 - 35		
							QC 2 - 39		
							QC 2 - 4		
							QC 2 - 40		
							QC 2 - 44		
							QC 2 - 45		
							QC 2 - 48		
							QC 2 - 49		
							QC 2 - 50		
							QC 2 - 51		
							QC 2 - 52		
							QC 2 - 54		
							QC 2 - 56		
							QC 2 - 57		
							QC 2 - 62		
							QC 2 - 63		
							QC 2 - 8		

Plex 2/21/19 9:19 AM Dart.lajeunesse.marie

66 2019-05-21

9-89

DAS

66

9-89

					QC 2 - 66	
					QC 2 - 64	
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	4/12/19	0.00 2.63	Mori Seiki TL-40 - 1 - B4B	
130	QC 2	1 pcs	4/12/19	0.00 0.00	QC 2 - 1	
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 54	
					QC 2 - 56	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	
					QC 2 - 66	
					QC 2 - 64	
140	QC 8	1 pcs	4/12/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	
					QC 8 - 67	
					QC 8 - 1 (A)	
					QC 8 - 47	
145	Crosstubes - 2 - B4B	1 pcs	4/12/19	0.00 0.64	Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	

DAS

66 2019-05-22

9-89

DAS

67 19-05-29

9-89

BB 19-5-29

150	Crosstubes - 3 - B4B	1 pcs	4/12/19	0.00 1.03	Crosstubes - 1 - B4B	MAY 30 2019
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
160	QC 7	1 pcs	4/12/19	0.00 0.00	QC 7 - 10	GP 19-05-31
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	
					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 6	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	
					QC 7 - 67	
170	Packaging 3-1 - Stock - B4B	1 pcs	4/12/19	0.00 0.00	Packaging 3 - 1 - B4B	
					Packaging 3 - 2 - B4B	
					Packaging 3 - 3 - B4B	
					Packaging 3 - 4 - B4B	
					Packaging 3 - 5 - B4B	
					Packaging 3 - 6 - B4B	
					Packaging 3 - 7 - B4B	
					Packaging 3 - 8 - B4B	
					Packaging 3 - 9 - B4B	
					Packaging 3 - 10 - B4B	
					Packaging 3 - 11 - B4B	
					Packaging 3 - 12 - B4B	
					Packaging 3 - 13 - B4B	
					Packaging 3 - 14 - B4B	
					Packaging 3 - 15 - B4B	
					Packaging 3 - 16 - B4B	
					Packaging 3 - 17 - B4B	
					Packaging 3 - 18 - B4B	
					Packaging 3 - 19 - B4B	
					Packaging 3 - 20 - B4B	
					Packaging 3 - 21 - B4B	
					Packaging 3 - 22 - B4B	
					Packaging 3 - 23 - B4B	
					Packaging 3 - 24 - B4B	
					Packaging 3 - 25 - B4B	
					Packaging 3 - 26 - B4B	
					Packaging 3 - 27 - B4B	
					Packaging 3 - 28 - B4B	
					Packaging 3 - 29 - B4B	

				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	
				Packaging 3 - 35 - B4B	DAS 21 MAY 31 2019
				Packaging 3 - 36 - B4B	DAS 21 MAY 31 2019
180 QC 21 - SA	1 pcs	4/12/19	0.00 0.00	QC 21 - SA - 21	
				QC 21 - SA - 70	DAS 21 MAY 31 2019
				QC 21 - SA - 53	DAS 21 MAY 31 2019

Part Op **100** - (Mori Seiki CNC Lathe Large) 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA706 2-Turn
 Descriptions: first side as per Folio FA706 3- File transition lines smooth.
110 - (QC2- Inspect parts off machine FAI/FAIB)
120 - 1-Turn second side as per Folio FA706 2- File transition lines smooth.
130 - QC2- Inspect parts off machine FAI/FAIB)
140 - (QC8- Inspect parts - second check)
145 - (Crosstubes)GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.
150 - (Crosstubes)1- handfinish X-TUBE INSIDE AND OUT
160 - QC7-Inspect Chemical Conversion Coat)
170 - (Identify as per dwg & Stock Location: _____)LOCATION : LG014
180 - (QC21- Final Inspection - Work Order Release)

Job BOM				
Part / Item	Component Name	Quantity	Operation	Container
D6008-132	Crosstube Extrusion	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F69799

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6008-132	1	66	0

Part Specifications	
Specifications could not be found.	



Container No: S182588



Part: D212 - 664 - 207TRN

Job No: 191075

Serial No/Batch: S182588

Revision: D

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
 1270 Aberdeen Street
 Hawkesbury, ON K64 1K7
 CANADA
 TEL.: 1 813 632-5200
 Email: sales@dartaero.com
 www.dartaerospace.com

Date: 05/21/19

Plex 2/21/19 9:19 AM Dart.lajeunesse.marie

①

DART AEROSPACE LTD	Work Order:	191075
Description: Crosstube Assembly (205/212 Low Aft)	Part Number:	D212-664-247
Inspection Dwg: D212-664-247 Rev: D		Page 1 of 2

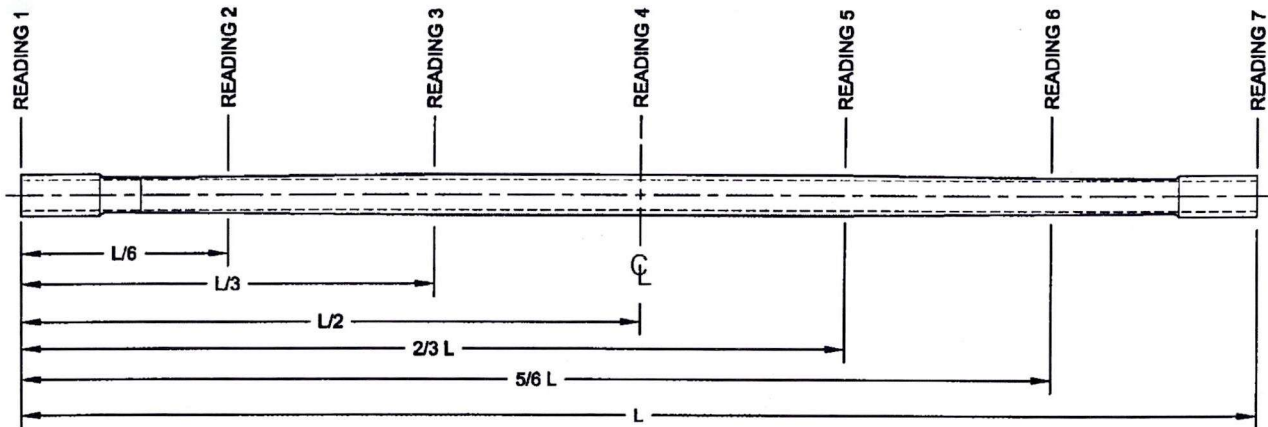
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.438	+/-0.010	Pls. Remove	DAS 35 9-89			
	2.680	+0.005/-0.000	2.682	✓		CNC-04	
	2.680	+0.005/-0.000	2.684	✓			
	2.687	+0.005/-0.000	2.692	✓			
	2.802	+0.005/-0.000	2.807	✓			
	2.906	+0.005/-0.000	2.911	✓			
	3.009	+0.005/-0.000	3.014	✓		CNC-05	
	3.112	+0.005/-0.000	3.117	✓			
	3.250	+0.005/-0.000	3.249	✓			stock
SIDE B	0.438	+/-0.010	Pls. Remove	DAS 35 9-89			
	2.680	+0.005/-0.000	2.683	✓		CNC-04	
	2.680	+0.005/-0.000	2.685	✓			
	2.687	+0.005/-0.000	2.692	✓			
	2.802	+0.005/-0.000	2.807	✓			
	2.906	+0.005/-0.000	2.911	✓			
	3.009	+0.005/-0.000	3.014	✓		CNC-05	
	3.112	+0.005/-0.000	3.117	✓			
	3.250	+0.005/-0.000	3.249	✓			stock
	128.268	+/-0.030	128.270	✓		Tape	

①

DART AEROSPACE LTD	Work Order:	192075
Description: Crosstube Assembly (205/212 Low Aft)	Part Number:	D212-664-247
Inspection Dwg: D212-664-247 Rev: D		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.168	.163	.144	.148	.024	0.054"
READING 2 L= 21.378	.237	.234	.195	.190	.047	
READING 3 L= 42.756	.408	.401	.398	.407	.010	
READING 4 L= 64.134	.448	.446	.451	.448	.005	
READING 5 L= 85.512	.412	.404	.397	.404	.015	
READING 6 L= 106.89	.230	.207	.196	.222	.034	
READING 7 L= 128.268	.163	.155	.147	.153	.016	

Calibration Result

Actual Block Thickness: 100-500

Sitescan 250 Measured Thickness: 100-500

Measured by: DAS 66	Audited by: DAS 67	Preliminary Approval:
Date: 2019-05-22	Date: 19-05-29	Date:

Rev	Date	Change	Revised by	Approved
A	08.11.07	New Issue (P/O D212-664-207)	KJ/EC	
B	10.04.01	Dwg Rev updated	KJ	
C	10.08.03	Dimension 128.268 was 128.27	KJ	
D	12.06.04	Wall thickness form added	KJ	
E	14.09.08	Dwg Rev updated	KJ	
F	17.07.12	Dwg Rev updated	KJ	

Item	Qty -247	Qty -247B	Part Number	Description
1	X		D212-664-247	CROSSTUBE ASSEMBLY (205/212 LOW AFT)
2		X	D212-664-247B	CROSSTUBE ASSEMBLY (214 LOW AFT)
3	1	1	D6008-132	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6	2	2	D3660-1	CUFF
7		2	D5018-1	SUPPORT
8	4	4	MS21920-28	CLAMP (OR MS21920-30)
9	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
10	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2
11	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6008-132
FINISHED LENGTH = 128.268±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) APPLY MATTE CLEAR COAT TO UNDERSIDE OF CROSSTUBE PER DART QSI 005 4.2
d) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
e) PAINT OUTSIDE PER DART QSI 005 4.2
f) AFTER PAINTING, REMOVE MASKING
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-247/-247B = 36.6 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- 10) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

- 13) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 14) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.
- 15) TO INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 16) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 191075 *405*
19-02-21

D	NOTE 2: ADD INSPECTION WINDOW (PAR17-601), SHEET 2: UPDATE ASSEMBLY DETAIL, SHEET 3: UPDATE ASSEMBLY DETAIL	JMH	17.05.01
C	D5018-1 WAS D2940-1 (-247B), PROSEAL WAS MAGNOBOND, ADD SHEET 3, NOTE 17: ADD 72HR CURE & RETORQUE, CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), INCORP. DEO B-1	CP	14.04.01
B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -247B (ZN C4-2, D5-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	17.05.01		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

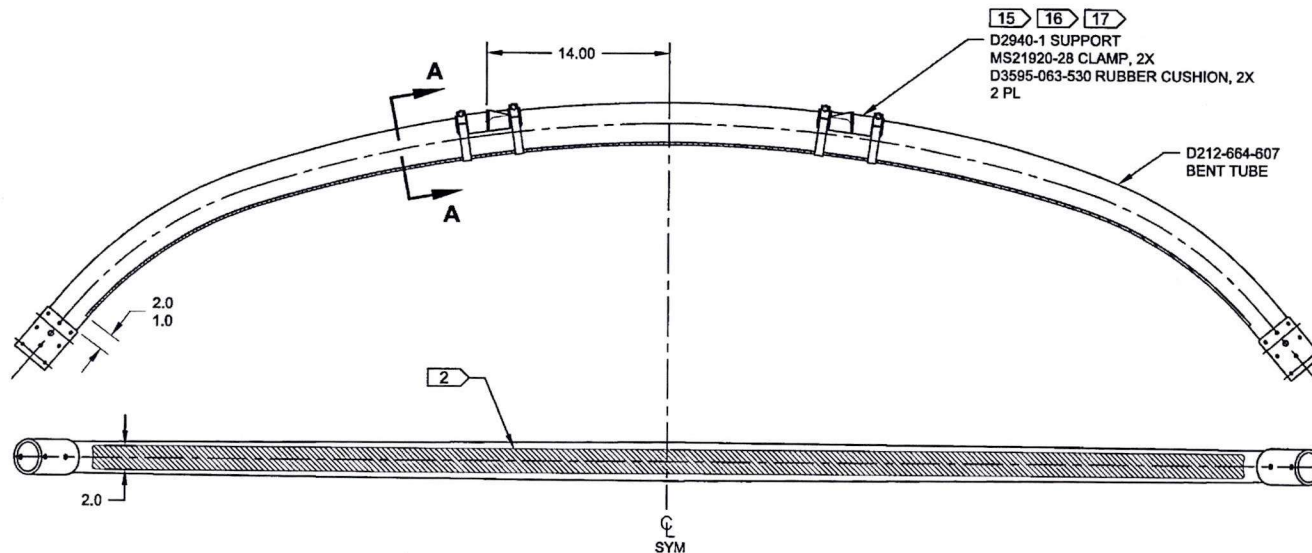
DRAWING NO.
D212-664-247
REV. D
SHEET 1 OF 5
TITLE
CROSSTUBE (205/212 LOW AFT)
SCALE
NTS

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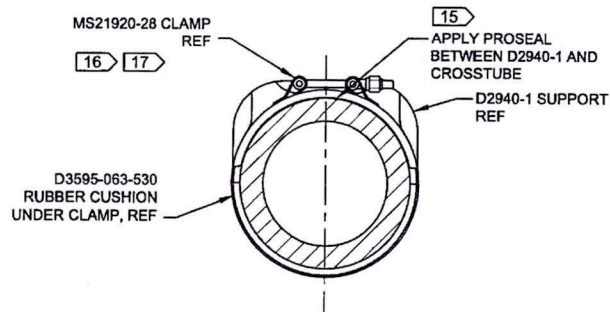
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2017 JUN 21 *40*
ECN17-593

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D212-664-247
ASSEMBLY DETAIL



SECTION A-A
SCALE 4X

RELEASED

2017 JUN 21

DESIGN	JP	DART AEROSPACE LTD	
DRAWN	JH	HAWKESBURY, ONTARIO, CANADA	
CHECKED	JS	DRAWING NO.	REV. D
MFG. APPR.	JS	D212-664-247	SHEET 2 OF 5
APPROVED	JS	TITLE	SCALE
DE APPR.	JS	CROSSTUBE (205/212 LOW AFT)	NTS
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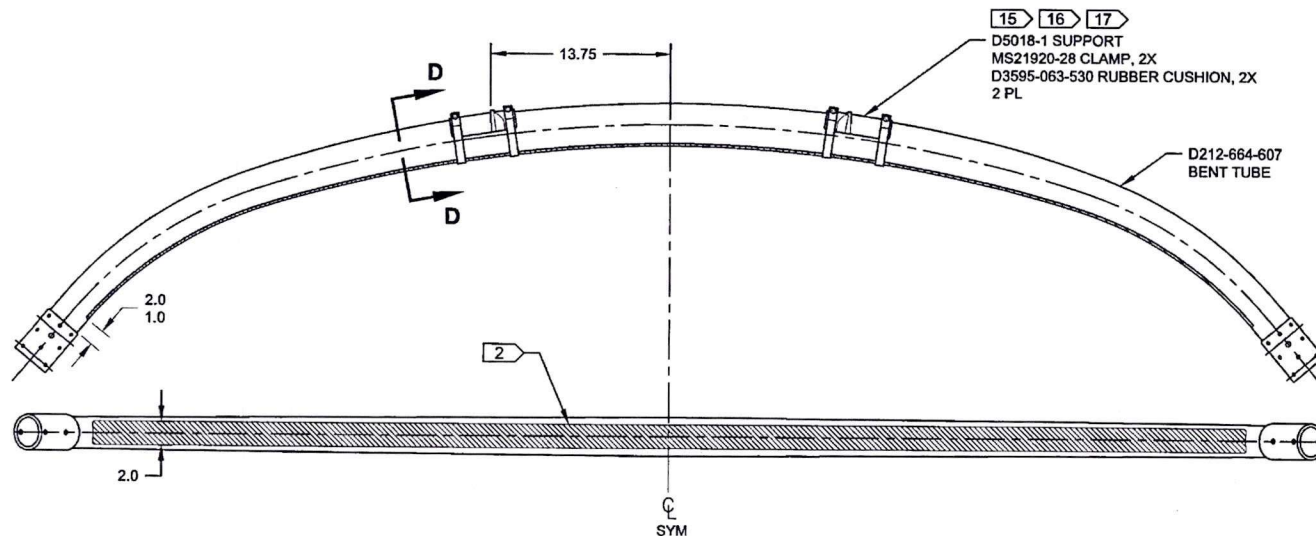
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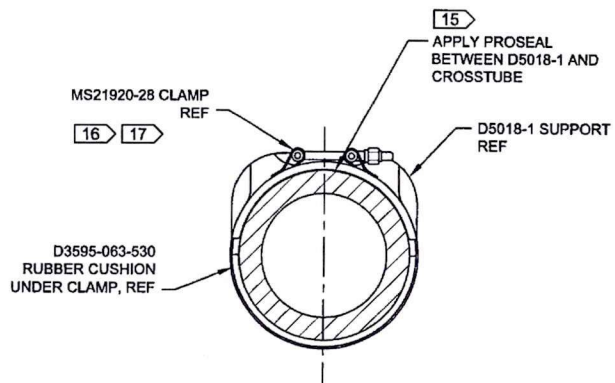
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D212-664-247B
ASSEMBLY DETAIL D



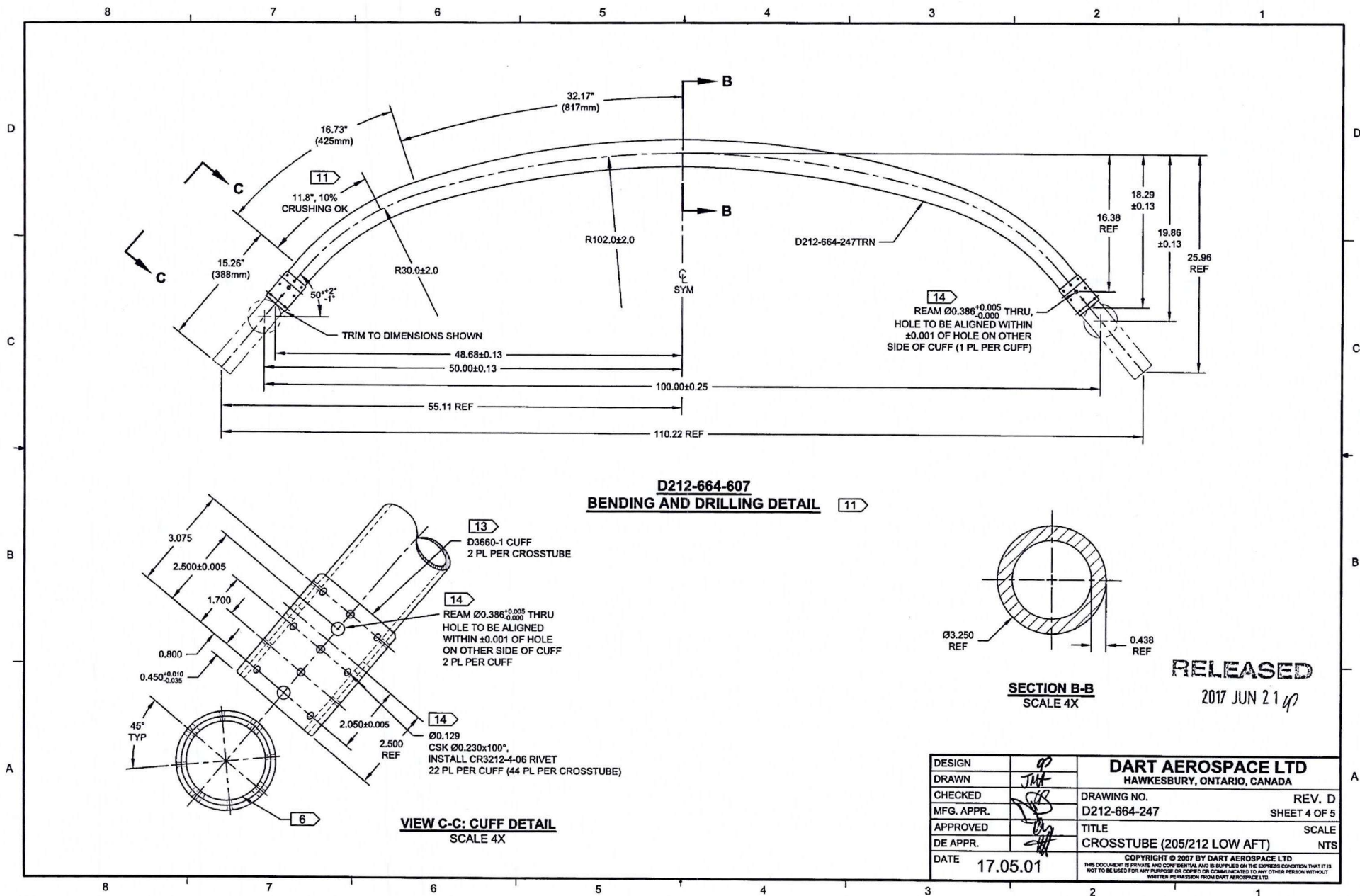
SECTION D-D
SCALE 4X

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2017 JUN 21 *qp*

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CHECKED	<i>DS</i>	DRAWING NO.	REV. D
MFG. APPR.	<i>DS</i>	D212-664-247	SHEET 3 OF 5
APPROVED	<i>DS</i>	TITLE	SCALE
DE APPR.	<i>DS</i>	CROSSTUBE (205/212 LOW AFT)	NTS
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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐	DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐			
Date :	Sequence #:	QTY Affected :		MRB (QSI042)	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor	
				QC / QA Coordinator	
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread			
Other/Details:					

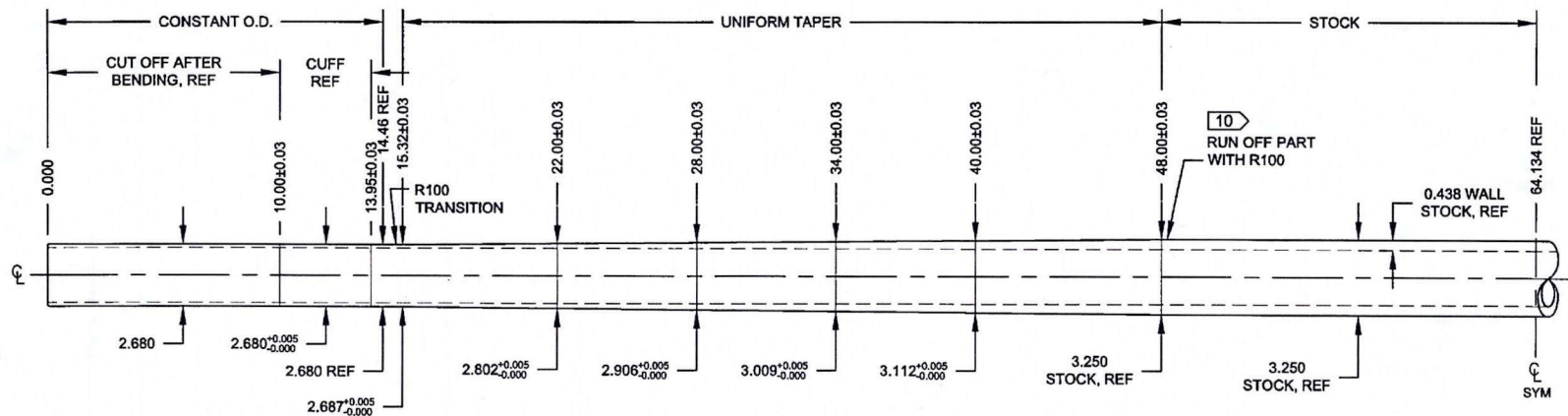
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D

C

B

A



D212-664-247TRN
TURNING DETAIL

RELEASED

2017 JUN 21 47

DESIGN		DART AEROSPACE LTD	
DRAWN	JMF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. D
MFG. APPR.		D212-664-247	SHEET 5 OF 5
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (205/212 LOW AFT)	NTS
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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: _____ Part No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐	DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐					
Date : _____		Sequence # : _____		QTY Affected : _____		MRB (QSI042)	
Description Work Order Deviation				Disposition			
				Completed By			
				Lead hand / Supervisor			
				QC / QA Coordinator			
Root Cause Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Presservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread					
Other/Details:							